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(54) IMPROVEMENTS IN OR RELATING TO WHEELED TROLLEYS

(71) I, JAMES SZAMAJ SIEDER, a British Subject of Devonshire Works, Dukes Avenue, Chiswick, London, W.4, do hereby declare the invention, for which I pray that a patent may be granted to me, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to wheeled trolleys and is more particularly concerned with devices of the kind adapted for personal use by travellers for luggage transportation purposes at railway and bus terminals, airports and like locations.

When loaded, trolleys of this kind can present a hazard when used on ramps or other inclined surfaces by getting out of the control of the user, particularly if the user's attention is momentarily distracted. It has been proposed to provide such luggage trolleys with self-applying braking means which need to be held off, i.e. in the non-braking position, by grapsing one or two handgrips in order to render the trolley mobile. Such known devices have not proved entirely satisfactory due to the inability of some users, particularly sufferers from muscular ailments, to exert sufficient or sustained pressure upon the aforesaid handgrips.

One object of the present invention is to provide an improved wheeled trolley construction by which the need to exert any gripping action in order to effect release of automatic braking means provided thereon is avoided.

A wheeled trolley in accordance with the present invention comprises a load-supporting framework mounted upon floor-engaging wheels, braking means associated with at least one of said wheels, said braking means including biasing means by which such braking means are self-applying unless released by the actuation of brake-release mechanism, a horizontal handrail carried by said framework at a position adjacent one end of the trolley and disposed transversely to the longitudinal or fore and aft axis of the trolley to form means by which the trolley can be propelled and steered, said handrail being so mounted that it is displaceable bodily to a limited extent in directions transverse to its length both forwardly and rearwardly relative to said load-supporting framework from a central position, said handrail being coupled to said brake release mechanism so as to actuate such mechanism to release the braking means whenever the trolley is either pushed or pulled by means of said handrail.

While frictional braking means, such as the application of a braking pad to a surface of a wheel of the trolley or of a brake drum attached thereto, may be employed in a preferred embodiment of the invention, the braking means has a form capable of positively locking the wheel or wheels concerned as by the entry of an end of an operating rod into one of a series of holes provided in a cylindrical part of the wheel or in an extension or flange thereon. In this way the effectiveness of the braking provided can be assured at all times regardless of the prevailing environmental conditions and without the need for a strong brake-applying spring pressure which has to be overcome by the user or any adjustment to accomodate wear.

In order that the nature of the invention may be more readily understood embodiments thereof will now be described by way of illustrative example and with reference to the accompanying drawings in which:—

Figure 1 is a side elevational view of one form of wheeled luggage trolley constructed in accordance with the invention.

Figure 2 is a front end view of the trolley shown in Figure 1.

Figure 3 is a rear end view of the trolley shown in Figures 1 and 2.

Figure 4 is a plan view of the trolley shown in the previous Figures.

Figure 5 is an enlarged scale detail elevational view of one of the trolley support wheels provided with braking means and its mounting.

Figure 6 is an end view of the structure of Figure 5 with the wheel itself shown in section.

Figure 7 is an enlarged vertical sectional view showing the operating handrail and associated parts.

Figure 8 is a fragmentary view showing an alternative friction pad type of wheel braking arrangement, while

Figure 9 is a fragmentary view similar to Figure 7 showing an alternative form of operating means.

Referring first to Figures 1—7 of the drawings, the trolley shown therein comprises a main load supporting framework 10 which includes two inner chassis bars 11 and two outer chassis bars 12 all disposed in a common plane which is slightly inclined to the horizontal in a downward direction from the forward end 13 of the trolley to the opposite, rearward, end 14 where the said chassis bars are rigidly interconnected with an end frame 15 which, being in a plane at right angles to the plane of the chassis bars, is itself slightly inclined to the vertical. A convenient angle of inclination is 5°.

As seen more clearly in the plan view of Figure 4, the inner and outer chassis bars 11, 12 have a W-formation in which the forward end of each inner bar 11 is joined to the forward end of the adjacent outer bar 12. The outer bars diverge from one another and are connected at their opposite, rearward, ends to the lower ends of side columns 16 of the end frame 15. The inner chassis bars 11 converge from their forward ends and at their rearward ends are connected respectively to the lower ends of two parallel spaced bars 17, 18 whose upper ends are joined to a transverse bar 19 extending between the side columns 16 of the end frame. A further transverse bar 20 extends between the side columns 16 nearer to the uppermost ends of such columns while an intermediate post 21 interconnects the mid-points of the two transverse bars 19, 20 to form a rigid structure, the main lower platform of which, constituted by the inner and outer chassis bars 11, 12, is adapted for the support thereon of major items of luggage. A basket 22 constituted by a main frame member 23 secured between the upper ends of the side columns 16 and attached strips 24, forms a convenient receptacle for smaller items of luggage, clothes, etc. Such basket 22 may, if desired, be adapted to form a seat for a child.

Towards the forward ends of each of the V-shaped half portions of the main framework, constituted by one inner chassis bar 11 and one outer chassis bar 12, is rigidly secured a dependent vertical column 25, conveniently formed of steel tubing, within the lower end of which is supported the pivotal bearing of an associated castor wheel 26. The lowermost ends of the two vertical columns 25 are conveniently strengthened by means of an interconnecting cross tie 27. The foremost apex ends of each V-shaped half-portion formed by the pairs of chassis bars 11, 12 is provided with a resilient buffer pad 28.

At each of the rearward framework corners formed by the junction of the lower end of a side column 16 with an outer chassis bar 12 is rigidly secured a support wheel assembly 29 which is non-castoring and is provided with self-applying braking means.

The particular form of such support wheel assembly is shown more clearly in Figures 5 and 6. A mounting bracket consisting of a main vertical side plate 30 and a further support plate 31 which provides a web spaced from the main plate in order to accommodate the support wheel 32 therebetween is rigidly secured, as by welding, to both the associated side column 16 and the related outer chassis bar 12. The wheel 32 has a central hub 33 containing suitable ball or roller bearings 34 whose inner members are carried upon an axle bolt 35 extending through aligned apertures in the plates 30, 31. The wheel 32 includes a main rim portion 36 around which is secured a tyre 37, conveniently of polyurethane. Such rim and tyre is slightly displaced towards one side of the mid-plane of the wheel while the rim carries, on the opposite side of such mid-plane, an axially directed flange 38 which is provided at suitable intervals, e.g. as intervals of 45°, therearound a series of radially directed holes 39. Circular dish-shaped thread guard plates 40 are located and clamped against each of the plates 30, 31 and surround the respective sides of the wheel within the rim 36 and flange 38 to reduce the risk of entrainment of string and other similar objects of waste which may lie upon the area of use of the trolley.

Each of the side columns 16 of the end frame 15 is of hollow section and carries therein, in substantial alignment with its longitudinal centre line, a brake rod 41 which projects at its lowermost end beyond the lower end of the side column and through an aperture in the side plate 31 of the support wheel structure and then through an aligned aperture in an additional stiffening web 43 so as to be capable of entering any one of the holes 39 in the flange 38 when such hole comes into alignment with the brake rod. As seen more clearly in Figure 7, the upper end of each brake rod 41 lies near to the upper end of the surrounding side column 16; such upper end of the brake rod is secured, as by welding, to a sleeve 44 which itself is either integral with or is rigidly secured to a further upwardly directed spindle 45 whose uppermost end projects through and is slidably supported in an aperture 46 in a bearing plate 47 which is of approximately L-shape and is rigidly secured, as by riveting or bolting, to the adjacent

parts of the end frame 15. In a modification, the spindle 45 is part of the brake rod 41.

The bearing plate 47 may have a flat upper surface or, as shown, it may have a transverse cylindrical depression 48 at the point of the aperture 46 to form a seating for a short roller 49 having a transverse slot 50 parallel with its end faces and extending practically to the roller axis. Within this slot 50 is accommodated the upper end of the spindle 45 which is pivotally connected to the roller by means of a dowel pin 51 which, as will be seen, lies eccentric to the axis of the roller. On a radial line diametrically opposite to the dowel pin 51, the roller is bored and tapped to receive the end of a radially directed stud 52, the uppermost end of which is secured, as by welding, to the related end of a horizontal, transversely directed, handrail 53. Trapped within the associated side column 16 is a helical compression spring 54 which surrounds the spindle 45 and lies within a tubular spring housing 55 whose uppermost end has a closure wall 56 containing a central aperture for slidably accommodating the spindle 45 and whose lower end slidably engages the sleeve 44. Such spring 54 operates as biasing means to press the spring housing against the underside of the roller bearing plate 46 and, in consequence, to exert a downward pressure upon the spindle 45 and the attached brake rod 41 thereby urging the latter in the direction to pass into any one of the holes 39 in the wheel flange 38 if presented in alignment therewith.

The position of the brake release mechanism as shown in full lines in Figure 7 is that of the normal or non-use state of the trolley. In this position the lower end of each of the two brake rods 41 passes into the first of the available holes 39 in the wheel flange as the trolley is moved to the slightest extent. Thereafter each of the wheels 32 becomes rigidly locked against rotation and the trolley accordingly rendered immobile. Movement of the trolley either by pushing in a forward direction or by pulling in the opposite or rearward direction, is effected by the exertion of appropriate force upon the transverse handrail 53. This causes a rolling movement of each of the interconnected rollers 49 over the surface of the associated roller bearing plate 47 as shown in dotted lines in Figure 7. Such rolling movement causes upward movement of the associated eccentric dowel pin 51 and a corresponding upward movement of each of the associated spindles 45 and brake rods 41. This causes withdrawal of the lowermost end of each brake rod from the immediate vicinity of the flange 38 of the associated wheel 32 and the consequent freeing of such wheel for rotary movement to allow the trolley to be moved as required by the person handling it. Immediately the movement force exerted upon the handrail is removed, the associated springs 54 cause return of the rollers 49 to the mid-position and an accompanying lowering of the brake rods 41 with entry of the lower ends of the latter into the next one of the holes 39 in the associated wheel flange to be presented to it. A stop colar 57 is welded to the sleeve 44 at a suitable position to engage the lower end of the spring housing 55 and prevent over-compression of the spring 54 and possible disengagement of the lowermost ends of the brake rods from their guides in the wheel support plates.

As may be seen from the further chain-dot line indications in Figure 1, a plurality of similar luggage trolleys as described may be nested together for economy of storage space. Such nesting is effected by reason of the W-shaped formation of the inner and outer chassis bars. A roller as shown at 58 (Figure 3) carried between the lower ends of the bars 17, 18 of the end frame 15 of a second trolley is caused to ride up the ramp surface 59 of a retaining pocket 60 formed of sheet metal and secured as by welding to the undersides of the two inner chassis bars 11. The entry of the roller on the second trolley internested with a first trolley causes lifting of the non-castoring and the automatically braked wheels 32′ of the second trolley clear of the ground surface. This allows the two trolleys to be moved as a single object by appropriate operation of the handrail of the first trolley in the manner already described. A similar action takes place when a third and any further trolleys are similarly internested, each of the internested trolleys being interlocked longitudinally and having its non-castoring and braked supporting wheels 32 rendered inoperative on being lifted clear of the ground surface.

The trolley is conveniently fabricated mainly from suitable section metal tubing such as square or circular metal tubing.

Various modifications may clearly be made without departing from the invention. For example, other shapings of internesting chassis parts may be employed, while other forms of braking means may be used. One alternative form is shown in Figure 8 where each of the non-castoring support wheels 32 is provided with a surrounding hood 61 made of fabricated sheet metal. The opposing side walls of this hood are provided with apertures for the transverse axial bolt 35 which supports the wheel 32 provided with a resilient tyre 37. Immediately above the tyre surface and within the hood is disposed an arcuate brake pad 62 of suitable friction material mounted upon the arcuate inner surface of a brake shoe 63 which is itself mounted for upward and downward move-

ment relative to the hood as by means of suitable friction material mounted upon the arcuate inner surface of a brake shoe 63 which is itself mounted for upward and downward movement relative to the hood as by means of suitable cross pins 64 working in slots 65 in the hood side plates. The centre point of the brake shoe 63 is rigidly connected to the lower end of the brake operating rod 41 while a strong helical compression spring 66 is trapped between the upper surface of the brake shoe and the underside of the upper wall of the hood to provide a constant brake-applying force for biasing the shoe towards the wheel tyre. The upper end of each brake rod is connected to suitable brake release means such as those already described, whereby the brake rod is normally free to move downwardly under the influence of the spring 66 to press the associated brake shoe and its friction lining firmly against the circumferential surface of the wheel tyre. As before, movement of the handrail in either direction causes lifting of the associated brake rods and the consequent lifting of the brake shoe from the wheel tyres.

A modified form of operating mechanism is shown in Figure 9 where the rollers 49 to which the upper end of associated brake rod 41 is connected by the eccentric dowel pin 51 is located between the extended side flanges of the related side column 16 and runs upon spaced rollers 67 freely rotatable upon pins 68 extending between the side flanges of said side column. The manner of operation is substantially identical with that already described for the first arrangement.

WHAT I CLAIM IS:—

1. A wheeled trolley comprising a load-supporting framework mounted upon floor-engaging wheels, braking means associated with at least one of said wheels, said braking means including biasing means by which such braking means are self-applying unless released by the actuation of brake-release mechanism, a horizontal handrail carried by said framework at a position adjacent one end of the trolley and disposed transversely to the longitudinal or fore and aft axis of the trolley to form means by which the trolley can be propelled and steered, said handrail being so mounted that it is displaceable bodily to a limited extent in directions transverse to its length both forwardly and rearwardly relative to said load-supporting framework from a central position, said handrail being coupled to said brake release mechanism so as to actuate said mechanism to release the braking means whenever the trolley is either pushed or pulled by means of said handrail.

2. A trolley according to claim 1 in which said braking means comprise a circular part rigidly connected to a trolley wheel and having a plurality of circumferentially disposed apertures therein and a radially directed reciprocable brake rod arranged to enter any one of said apertures under the action of spring biasing means unless withheld by actuation of said brake release mechanism.

3. A trolley according to claim 2 in which said circular part is a flange integral with the wheel rim.

4. A trolley according to claim 1 in which said braking means comprise a friction pad urged by spring biasing means into frictional engagement with the periphery of the wheel unless withheld therefrom by actuation of said brake release mechanism.

5. A trolley according to any of the preceding claims in which at least one end of said handrail is connected to a rotatable disc or roller to cause rotary movement of the latter relative to an adjacent part of the trolley framework, said disc or roller having an eccentric pin connected to one end of a brake operating rod, whereby the latter is caused to move in a brake releasing direction by either forward or backward movement of said handrail.

6. A trolley according to claim 5 in which each end of said handrail is connected to an associated rotatable disc or roller which is coupled to the related one of two separate brake rods effective respectively upon the braking means of two wheels of the trolley.

7. A trolley according to any of the preceding claims in which the wheel or wheels provided with said braking means is/are of the non-castoring type.

8. A trolley according to any of the preceding claims which comprises a main framework shaped to permit nesting of one trolley at least partially within another.

9. A trolley according to claim 8 which comprises a main load-supporting portion comprising two pairs of chassis bars disposed in a W-formation.

10. A trolley according to claim 9 in which the common lower junction points of adjacent pairs of said chassis bars are secured to means for supporting castor-type wheels.

11. A trolley according to any of claims 8—10 which includes means for lifting the automatically braked wheel or wheels of a second trolley clear of the floor surface when it is nested within a first trolley.

12. A trolley according to claim 11 in which said means comprise a central roller at one end of the trolley and a retaining pocket for the similar roller of another trolley secured to the main framework of the trolley, said pocket having a ramped entry

surface for co-operation with such central roller of the other trolley.

13. A wheeled trolley substantially as described with reference to Figures 1—7 or Figure 8 or Figure 9 of the accompanying drawings.

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Sheet 1

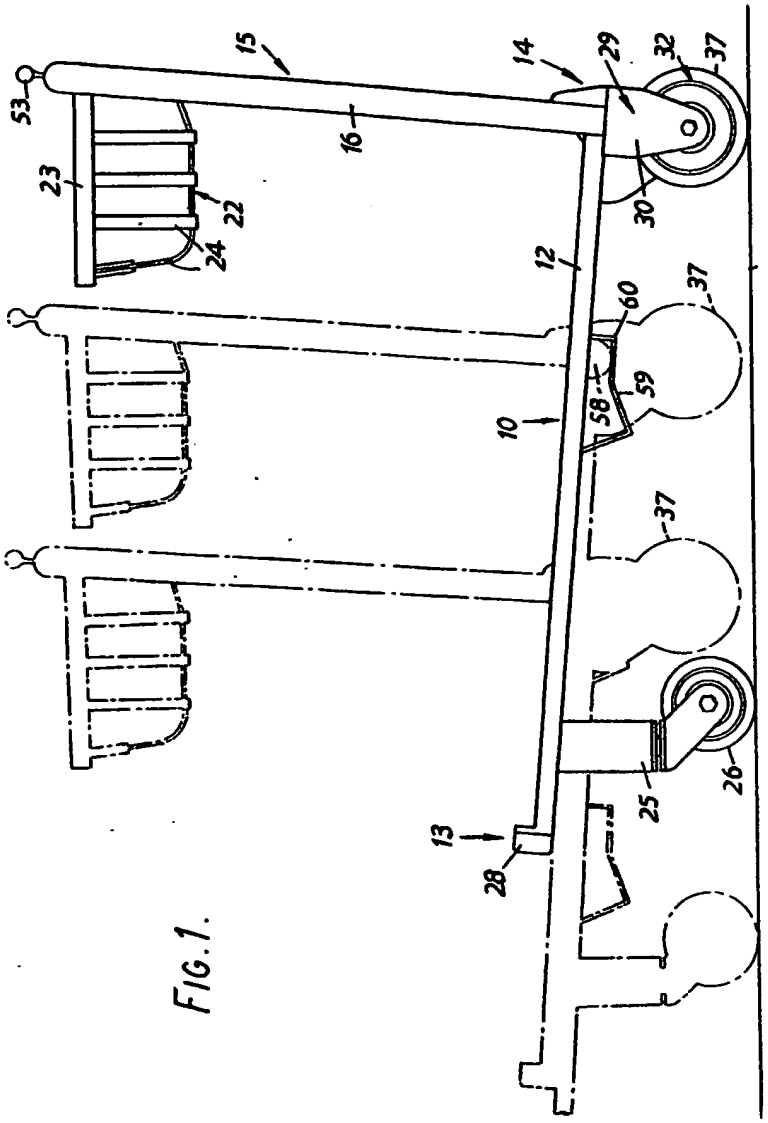

FIG. 1.

FIG. 2.

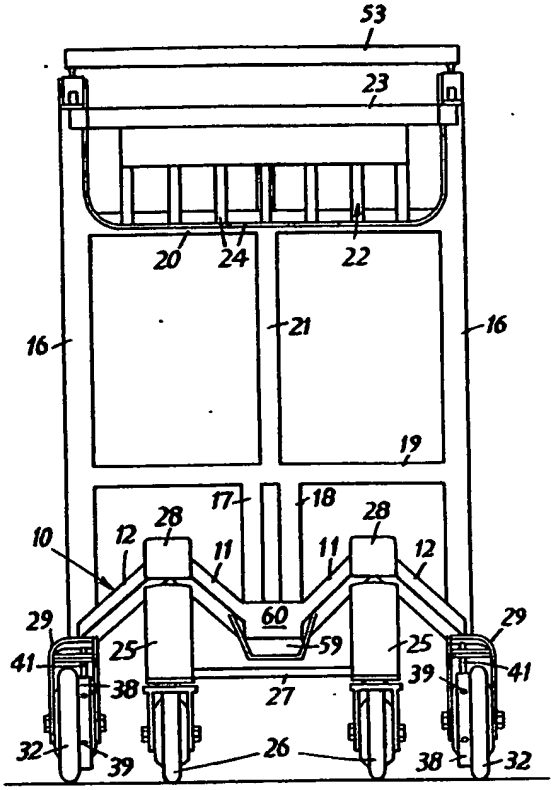
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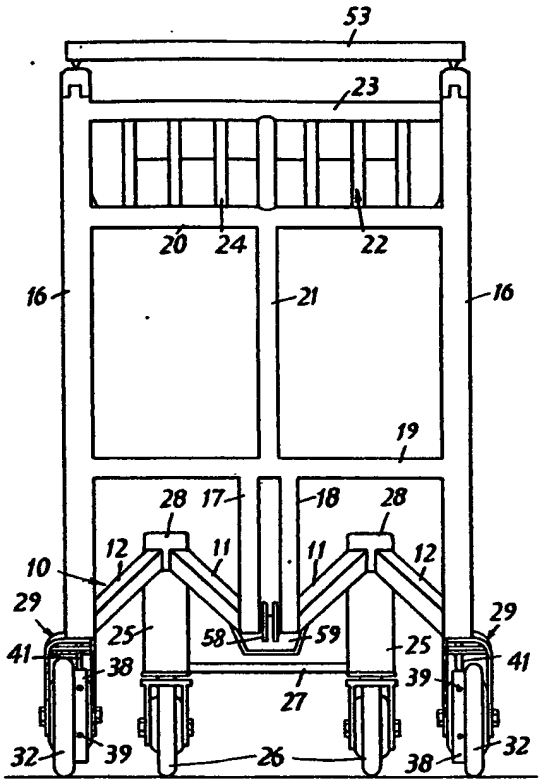
FIG. 3.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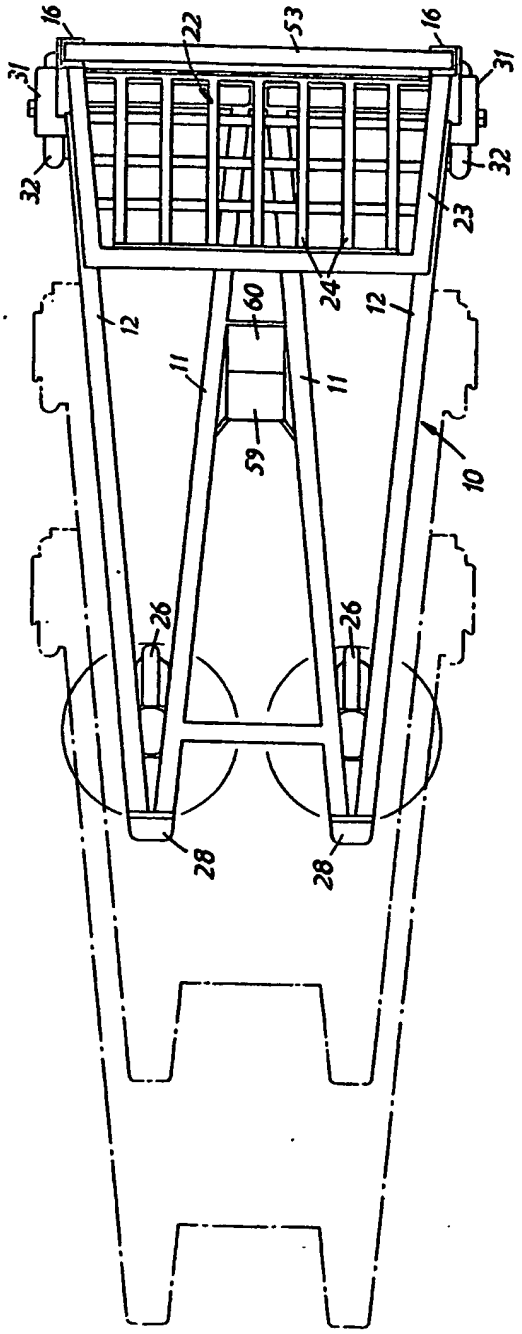

FIG. 4.

FIG.5.

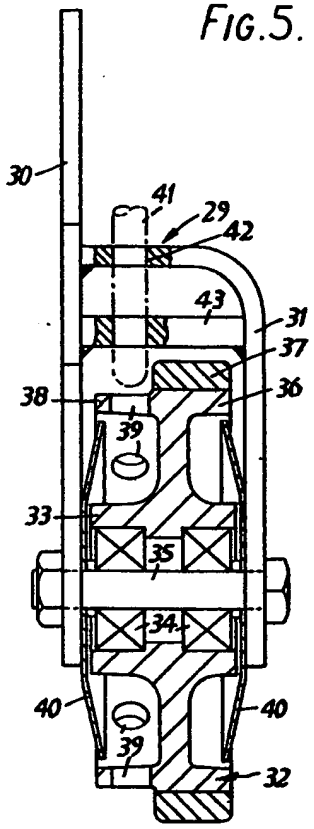

FIG. 6.

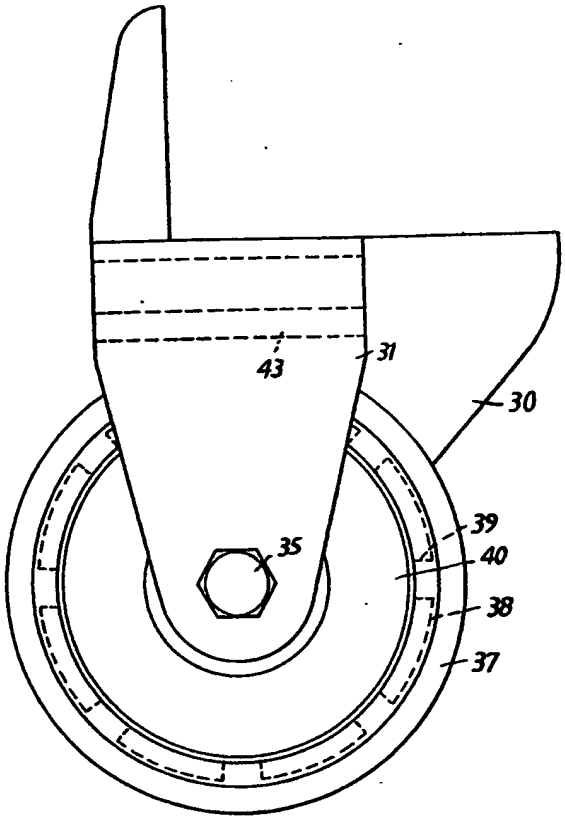

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FIG. 7.

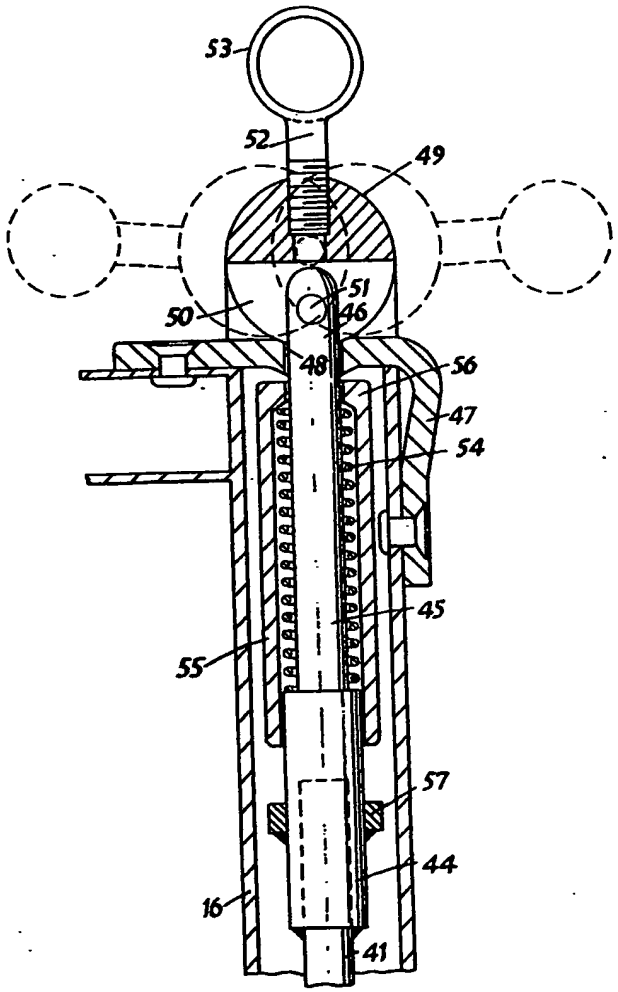

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FIG. 8.

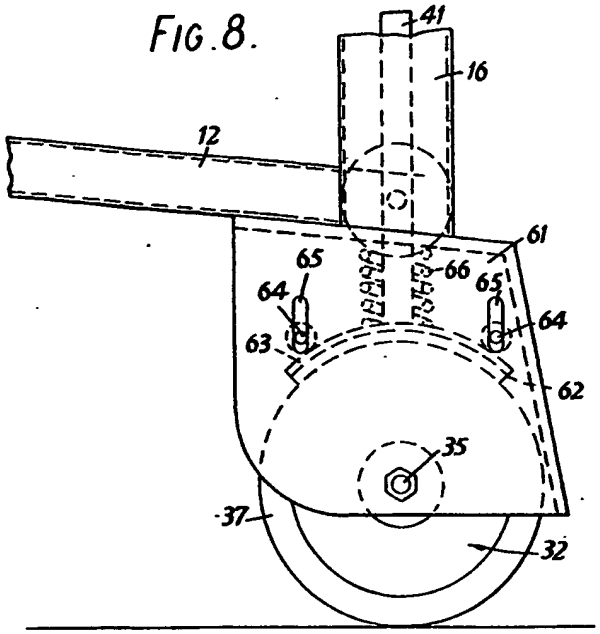

FIG. 9.